

HATCHERY EVALUATION REPORT

Umatilla Hatchery - URB Fall Chinook

September 1996

Integrated Hatchery Operations Team (IHOT)

HATCHERY EVALUATION REPORT

Umatilla Hatchery - URB Fall Chinook

An Independent Audit Based on Integrated Hatchery Operations Team (IHOT) Performance Measures

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Project Number 95-2
Contract Number 95AC49468

September 1996

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Executive Summary

This report presents the findings of the independent audit of the Umatilla Hatchery - URB Fall Chinook program. The hatchery is located on the Columbia River near Irrigon in northeastern Oregon. The hatchery is used for egg incubation and rearing of summer steelhead, spring chinook, fall chinook, and winter steelhead.

The audit was conducted in 1996-1997 as part of a 2-year effort that will include 67 hatcheries and satellite facilities located on the Columbia and Snake River system in Idaho, Oregon, and Washington. The hatchery operating agencies include the U.S Fish and Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife.

Background

The audit is being conducted as a requirement of the Northwest Power Planning Council (NPPC) Strategy for Salmon and the Columbia River Basin Fish and Wildlife Program. Under the audit, the hatcheries are evaluated against policies and related performance measures developed by the Integrated Hatchery Operations Team (IHOT). IHOT is a multi-agency group established by the NPPC to direct the development of new basinwide standards for managing and operating fish hatcheries. The Bonneville Power Administration (BPA) contracted with Montgomery Watson to act as an independent contractor for the audit.

IHOT has established five basic policies that cover: (1) hatchery coordination, (2) hatchery performance standards, (3) fish health, (4) ecological interaction, and (5) genetics. The audit focuses on all these policies, with the exception of hatchery coordination. These policies are set forth in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995)*. That document is the source for the performance measures that are the basis of this audit.

The Audit Process

The audit was based on the facility management's response to a 109-page questionnaire. This audit form was completed through a five-step process in which:

- Information was obtained from headquarters.
- The hatchery manager was asked to fill out and return the audit form.
- A 1-2 day site audit inspection visit was conducted to inspect facilities, review hatchery records, discuss audit form responses, and develop remedial action plans.
- A compliance report was developed to document the compliance status of each performance measure. This report was then shared with the hatchery manager and IHOT representative.
- This hatchery evaluation report was written to document compliance with IHOT performance measures and develop cost estimates for remedial actions when needed.

Umatilla Hatchery - URB Fall Chinook Results

The hatchery began operation in 1991 to provide salmon and steelhead for release into the Umatilla River. The Umatilla Hatchery facility includes 10 concrete Oregon ponds, 24 concrete Michigan ponds, 8 Canadian troughs, and incubation facilities. One aspect of the Umatilla Hatchery's operation is an evaluation of the results of rearing in Oregon vs. Michigan ponds. The entire hatchery water supply is groundwater.

The hatchery was in general compliance with most of the performance measures. In the area of program objectives, it was not possible to evaluate compliance for smolt to adult survival because returns of fish reared at the hatchery have only recently begun, and survival data is not yet available. In the area of facilities requirements, the audit found that the hatchery was not in compliance with the recommended water temperature criteria for incubation and rearing and did not meet the monitoring requirements for chemistry, nitrite, and contaminants. The audit also found that the facility was not in compliance with monitoring requirements for the frequency of checking alarms and the criteria for verification of feed ingredients by a regional quality control officer. The hatchery has insulated feed hoppers but they are not adequate to maintain the contents at or below 80°F on very hot days. In the area of hatchery practices, the audit found that the hatchery had no written standards for incubation, written loading and flow criteria, or specific smoltification criteria. The hatchery also did not meet two IHOT criteria for disinfection of transport vehicles. In the area of genetics policy, the hatchery did not have written spawning protocols or a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Umatilla Hatchery - URB Fall Chinook program requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in alphabetical order without intent of ranking or otherwise assigning priority:

- Begin routine testing of alarms using IHOT recommendations
- Conduct IHOT feed QA/QC testing
- Develop a genetics monitoring and evaluation program in IHOT Operations Plan
- Develop smoltification goal and monitoring plan
- Develop specific incubation standards and written incubation practices for the IHOT

Operations Plan

- Develop written flow and loading criteria for incubation in IHOT Operations Plan
- Develop written spawning protocols in IHOT Operations Plan
- Document adult contribution
- Document adult pre-spawning survival over time
- Follow IHOT disinfection policies for transportation
- Monitor chemistry, nitrite, and contaminants on routine basis
- Provide a second set of screens for all raceways (24 Michigan ponds and 12 Oregon ponds)

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery (Type 1 in Table 3, Section 4) were not listed above.

Facility Description

Name: Umatilla Hatchery
Stock/Species: URB Fall Chinook
Operating Agency: Oregon Department of Fish and Wildlife
Funding Agency: Bonneville Power Administration
Location: Near Irrigon, OR on the Columbia River
Address: Umatilla Hatchery
Oregon Department of Fish and Wildlife
Route 2, Box 151
Irrigon, OR 97844

Hatchery Manager: Mr. Jack Hurst
Phone: (541) 922-5659

Fax: (541) 922-5664

Purpose: The Umatilla Hatchery was authorized under the Northwest Power Planning Council's (NPPC) Fish and Wildlife Program and began operation in 1991. Hatchery funding is provided by Bonneville Power Administration. The hatchery is used for egg incubation and rearing of spring chinook, fall chinook, and summer steelhead for release into the Umatilla River.

Production Goal: Production goal for the Umatilla Hatchery has been reduced from

original plan because of water shortage; planned for 15,000 gpm but only can produce 8,000 to 10,000. These are the FY96 production goals for the Umatilla Hatchery:

Summer Steelhead

150,000 smolts (30,000 lbs) for acclimation and release at Bonifer and Minthorn facilities on the Umatilla River

Spring Chinook

390,000 smolts (48,750 lbs) for acclimation and release at Thornhollow and Imeqes C-mem-ini-kem facilities on the Umatilla River

URB Fall Chinook

2,682,000 subyearlings (44,700 lbs) for acclimation and release at Thornhollow and Imeqes C-mem-ini-kem facilities on the Umatilla River

Water Supply: Facilities:

Pumped supply from 4 remote wells producing a total of 5,100 gpm

Adult Holding:	N/A
Incubation:	192 16-tray vertical incubators 30 stacks of 3, 4-tray vertical incubators
Early Rearing:	8 Canadian troughs - 576 cf
Raceways:	10 Oregon ponds - 5,972 cf each

24 Michigan ponds - 2,252 cf each

Rearing Ponds: None

Satellite Facilities: Acclimation and release of all stocks: Bonifer, Minthorn,
Thornhollow, and Imeqes C-mem-ini-kem ponds

Fall chinook broodstock holding and spawning: Three Mile Falls Dam
facility

Compliance Status

The hatchery audits are based on compliance with written IHOT performance measures. These performance measures are documented in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (referred to as *IHOT 1995* in this report).

The purpose of the performance measures is to implement new basinwide policies that provide regional guidelines for operating anadromous hatcheries in the Columbia Basin.

The audit focuses on performance measures for IHOT policies that cover (1) hatchery performance standards, (2) fish health, (3) ecological interaction, and (4) genetics. These performance measures are intended to guide hatchery operations once production is established. For that reason, the hatchery operations audit included broodstock collection, spawning, incubation of eggs, fish rearing and feeding, fish release, equipment maintenance and operations, and personnel training. Production priorities are beyond the scope of this audit.

Based on *IHOT 1995*, a detailed 109-page audit form was developed. The audit form divided the performance measures into six major sections along major program and technical criteria areas. Two additional sections (sections 1 and 8) include general information and expenditure information needed for the Hatchery Evaluation Report and blank forms for additional comments:

- | | |
|-----------|--|
| Section 1 | Performance Measures for General Information and Expenditure Information (PMs General 1-2) |
| Section 2 | Performance Measures for Program Objectives (PMs 1-4) |

Integrated Hatchery Operations Team (IHOT) 1995. *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries*, Bonneville Power Administration, Portland, Oregon.

Section 3	Performance Measures for Facility Requirements (PMs 5-15)
Section 4	Performance Measures for Hatchery Practices (PMs 16-25)
Section 5	Performance Measures for Fish Health Policy (PMs 26-34)
Section 6	Performance Measures for Ecological Interactions (PMs 35-38)
Section 7	Performance Measures for Genetics Policy (PMs 39-43)
Section 8	Blank Forms for Additional Comments

Several performance measures are repeated in various sections of the audit form. These performance measures overlap in *IHOT 1995* and were retained to allow individuals interested in specific portions of the audit (such as Genetics or Fish Health) to determine the compliance status of all performance measures for a given topic in one location. A repeated performance measure is indicated by shaded text.

The Hatchery Audit Process

The hatchery audit will be conducted over a 2-year period that concludes in 1997. At each hatchery, a five-step process was used to complete the overall hatchery audit. This process consisted of research and on-site visits. The site visit was conducted on September 17 - 18, 1996.

The following is the five-step audit process:

1. Information was obtained from headquarters.
2. The hatchery manager was asked to fill out and return the **Audit Form**.
3. A 1-2 day site audit inspection visit was conducted at each hatchery. During that visit an audit team inspected facilities, reviewed hatchery records, discussed audit form responses, and developed remedial action plans when appropriate.

4. During the site visit, the compliance status of each performance measure was discussed with the hatchery manager and IHOT representative. A portion of the Hatchery Evaluation Report was sent to the hatchery manager following the audit visit as a **Compliance Report**. That compliance Report is Table 2 of this document.
5. This information from steps 1 - 4 was used to prepare a draft **Hatchery Evaluation Report**. This draft report was submitted to the operating agencies for review of the information used to determine compliance. Based on review and comments, a final Hatchery Evaluation Report was developed. The final report documents the compliance of a particular hatchery with the IHOT performance measures and presents cost estimates to correct any deficiencies.

Compliance Status of Umatilla Hatchery - URB Fall Chinook

The following table includes information on life-stages that are held on this facility for some portion of their rearing cycle (Table 1). For multi-facility programs, summary cost and contribution data is presented at the facility where rearing occurs. For the compliance status relating to performance measures that do not occur at this hatchery, please refer to the Hatchery Evaluation Reports for the hatcheries and stocks listed in Table 1. A check mark (✓) indicates that the specific life stage is held at this facility.

This section documents the compliance status of the Umatilla Hatchery - URB Fall Chinook. Each performance measure is presented in a table taken from the audit form (Table 2). The compliance status is identified by the following categories:

- **N/A** (not applicable)
- **Yes** (in compliance)
- **?** (unknown; generally due to unavailability of information to determine compliance)
- **No** (not in compliance).

Remedial actions are suggested for performance measures not in compliance. These remedial actions are grouped into categories and listed in Section 4 of this report, where the cost of the required remedial actions is also presented.

Table 1 Summary Program Information for Umatilla Hatchery - URB Fall Chinook

Component	Location of Adult Holding, Spawning, Incubation, and Rearing					
	Three Mile Falls Dam ¹	Umatilla Hatchery	Imeques C-mem-ini-kem	Thornhollow		
Adult Collection	4					
Adult Holding	4					
Spawning	4					
Fertilization	4					
Incubation		4				
green-to-eyed		4				
eyed-to-hatch		4				
Rearing						
fry		4				
fingerlings		4				
smolts		4				
Acclimation/release			4	4		

¹ Adult collection, holding, spawning, and fertilization also occurs at Bonneville, Little White Salmon, and Priest Rapids Hatcheries.

Use of broodstock from these facilities will decrease over time as fall chinook returns to the Umatilla River increase.

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#1	Are the hatchery programs outlined in a subbasin management plan?		4			Columbia Basin System Planning Production Plan and Umatilla Hatchery and Basin Annual Operation Plan (AOP)	
#2	Is the hatchery operating under a current hatchery operational plan? Is it understood by staff? Is it being followed?		4 4 4			IHOT Operations Plan and Umatilla Hatchery and Basin AOP	
#3	Is a hatchery monitoring and evaluation plan in place? Do you have a written monitoring and evaluation plan?		4			Umatilla Hatchery and Basin AOP	
#4a	Adult contribution to fisheries, spawning grounds, and hatchery			4		Data for 1991 and 1992 brood years unavailable	Document adult contribution
#4b	Adult pre-spawning survival as compared with established goal			4		No data provided for review; holding facility not in operation long enough to provide the information	Document adult pre-spawning survival over time
#4c	Egg-take as compared with established hatchery goal		4			Review of records/Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#4d	Green-egg to eyed-egg survival as compared with established goal				4	Remote egg-take and transport shock has led to low survival. In compliance 1 year out of 3	Increase egg-take from Three Mile facility as run size increases over time or ship gametes rather than fertilized eggs
#4e	Eyed-egg to fry survival as compared with established goal		4			Review of records/Discussion	
#4f	Fry to smolt survival as compared with established goal			4		Subyearling program in compliance Yearling program not in compliance/ incomplete data for 1995 brood year	Improve fry-to-smolt survival, need to evaluate data in subsequent years
#4g	Production as compared with established goal		4			Production at goal set in current AOP	
#4h	Percent survival (smolt to adult) as compared with established goal			4		Data not yet available for determination of compliance	Develop the data as hatchery operations continue and information on brood years becomes available
#4i	Number of eggs, fry, fingerlings, smolts, and/or adults to meet basinwide needs	4				Review of records/Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#5a	Temperature						
	Does your water temperature meet the criteria for spawning?	4				No adults held on station	
	Does your water temperature meet the criteria for incubation?				4	Use chillers to retard development and meet program requirements	None. Temperature modification required to meet program goals.
	Does your water temperature meet the criteria for rearing?				4	Exceed high end of temperature range by 1-5°F in summer	None. Does not affect production timing or size at release.
#5b	Dissolved gases						
	Is the oxygen level near saturation?		4			Review of 4 years' data	
	Is the dissolved nitrogen level less than saturation?		4			Review of 4 years' data	
#5c	Chemistry						
	Ammonia (un-ionized)			4		No data for supply water	Run analysis
	Carbon Dioxide			4		No data for supply water	Run analysis
	Chlorine			4		No data for supply water	Run analysis
	pH			4		No data for supply water	Run analysis
	Copper			4		No data for supply water	Run analysis
	Hydrogen Sulfide			4		No data for supply water	Run analysis
	Iron			4		No data for supply water	Run analysis
	Zinc			4		No data for supply water	Run analysis

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#5d	Turbidity						
	Does your turbidity meet the criteria?		4			Groundwater supply with no visible turbidity	
#5e	Alkalinity and hardness						
	Does your alkalinity and hardness meet the criteria?		4			Review of 4 years' data	
#5f	Nitrite						
	Does your nitrite meet the criteria?			4		No data	Run analysis

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#5g	Contaminants						
	Aldrin			4		No data for supply water	Run analysis
	Endrin			4		No data for supply water	Run analysis
	Dieldrin			4		No data for supply water	Run analysis
	Heptachlor			4		No data for supply water	Run analysis
	Chlordane			4		No data for supply water	Run analysis
	Methoxychlor			4		No data for supply water	Run analysis
	Lindane			4		No data for supply water	Run analysis
	Malathion			4		No data for supply water	Run analysis
	Guthion			4		No data for supply water	Run analysis
#5h	Pathogens						
	What portions of the hatchery have disease-free water?						
	Adult holding	4				No adults held on station	
	Incubation		4			Groundwater	
	Early rearing		4			Groundwater	
	Rearing		4			Groundwater	
	Others		4			Groundwater at truck fill station	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#6	Alarm Systems						
	Do the following areas have alarms?						
	Intake		4				
	Large rearing ponds and adult holding ponds	4				No adults held on station	
	Raceway headboxes and rearing ponds		4			Inspection of facilities/Discussion	
	Incubation facilities		4			Inspection of facilities/Discussion	
	Quarantine areas and facilities	4				No quarantine areas or facilities	
	Water treatment systems		4				
	Security		4				
	Are there outside systems and buzzers in on-site residences?		4			Discussion	
	Are water flow alarms checked daily?				4	Discussion	Develop daily checking routine
	Are all other alarms checked weekly?				4	Discussion	Develop weekly checking routine
	Is there a log of alarms for emergencies, tests, and maintenance requirements?				4	Discussion	Develop alarm log
	Are telephone pagers used?				4	Discussion/Residences are hard-wired to alarms	None. Not a problem
#7	Adult collection and holding facilities						
	Do you meet the adult holding criteria?	4				No adults held on station	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

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PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#8	Incubation facilities						
	Type 1: <u>16-tray vertical stacks</u> Do you have an adequate number of units for the overall program?		4			Inspection of facilities/Discussion	
#9	Type 2: <u>3,4-tray stacks</u> Do you have an adequate number of units for the overall program?		4			Inspection of facilities/Discussion	
	Rearing facilities						
	Type 1: <u>Oregon Ponds</u> Do you have an adequate number of units for the overall program?		4			Inspection of facilities/Discussion	
	Type 2: <u>Michigan Ponds</u> Do you have an adequate number of units for the overall program?		4			Inspection of facilities/Discussion	
	Type 3: <u>Canadian Troughs</u> Do you have an adequate number of units for the overall program?		4			Inspection of facilities/Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#10	Screening facilities						
	Do you meet the approach velocity criteria?	4				Groundwater supply - no screens needed	
	Are the fish screens regularly cleaned?	4				Groundwater supply - no screens needed	
	Does the screen mesh meet screen opening criteria?	4				Groundwater supply - no screens needed	
	Are rearing containers double screened for fish that should not be released to adjacent water?				4	Have slots for second screen but do not use them	Provide second set of screens
#11	Predator control facilities						
	Are your predation control facilities effective?		4			Inspection of facilities/Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#12	<p>Food storage facilities and quality control</p> <p>Does the storage of dry/semi-moist/moist foods (dry<12%; semi-moist 12-20%; moist >20% moisture) follow food manufacturer's recommendations?</p> <p>Does a regional quality control officer oversee production procedures and monitor:</p> <p>Verification by feed manufacturer that ingredients meet specifications?</p> <p>Ensure feed does not contain unwanted drugs or other additives?</p> <p>Analyze ingredients contained in the final food product to ensure that feed specifications have been met?</p> <p>Are the foods stored and handled according to the following criteria?</p> <p>Moist pellets should not exceed 10 °F at point of delivery.</p>		4			<p>Inspection of facilities/Discussion</p> <p>Discussion with hatchery manager and regional quality control officer</p> <p>Discussion with hatchery manager and regional quality control officer</p> <p>Discussion with hatchery manager and regional quality control officer</p> <p>Discussion</p>	<p>Verify ingredients meet specifications</p> <p>Inspect for unwanted drugs and additives</p> <p>Analyze ingredients against feed specifications</p>

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Moist pellets should be removed from freezer just prior to feeding.		4			Discussion	
	Do not leave buckets of feed or feed containers outside exposed to light or heat.		4			Discussion	
	Open bags of feed should be fed within one to two days except when feeding small groups of fish.		4			Discussion	
	Automatic feeder hoppers and bulk storage facilities should be insulated against excessive temperatures (80°F and above).				4	Discussion/Feed hoppers are insulated but reach or exceed ambient in hot (>90°F) weather	Unknown. Have not noticed a problem when this occurs.

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#13	Release facilities Do the release facilities ensure that fish are not subjected to adverse conditions?		4			Inspection of facilities/Discussion	
#14	Pollution abatement facilities Do the pollution abatement facilities meet all federal and state regulations (or good engineering practice)?		4			Inspection of facilities/Discussion	
	Are pollution abatement facilities operated correctly?		4			Discussion	
#15	Transportation facilities Are the transport systems adequate to meet IHOT performance measures for transportation practices?		4			Inspection of facilities/Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#16	Broodstock selection practices						
	Is the donor selection process document attached?	4				Existing program; does not apply	
	Was the donor selection outline followed in selecting the hatchery broodstock?	4				Existing program; does not apply	
	Go to PM #40 in Genetics Section						
#17	Spawning practices						
	Were the appropriate number of spawners, male/female ratios, and fertilization protocols used?	4				See PM #42	
	Go to PM #42 in Genetics Section						
#18	Incubation practices						
	Are specific incubation standards listed in the hatchery operations plan?				4	Reviewed IHOT Operations Plan (OP)	Develop standards for the OP
	Are incubation practices written?				4	None supplied to inspection team	Develop standards for the OP
	Incubation Type 1: <u>Vertical</u> (see PM #8) Do you meet the loading and flow criteria?			4		Review of records/Discussion. Not a problem in meeting program requirements.	Develop written loading and flow criteria

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	? 4	No		
	Incubation Type 2: <u>Vertical</u> (see PM #8) Do you meet the loading and flow criteria?					Review of records/Discussion. Not a problem in meeting program requirements.	Develop written loading and flow criteria

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#19	Rearing practices						
	Are specific rearing standards listed in the hatchery operations plan?		4			Review Hatchery AOP for 1996	
	Are rearing practices written?		4			Review of rearing standards in Hatchery AOP	
	Rearing Unit Type 1: <u>Oregon</u> (see PM #9) Do you meet the density and DI criteria?	4				Discussion	Criteria under evaluation as part of M&E program
	Do you meet the Loading and FI criteria?	4				Discussion	Criteria under evaluation as part of M&E program
	Rearing Unit Type 2: <u>Michigan</u> (see PM 9) Do you meet the density and DI criteria?	4				Discussion	Criteria under evaluation as part of M&E program
	Do you meet the Loading and FI criteria?	4				Discussion	Criteria under evaluation as part of M&E program
	Rearing Unit Type 3: <u>Canadian</u> (see PM 9) Do you meet the density and DI criteria?	4				Discussion	Criteria under evaluation as part of M&E program
	Do you meet the Loading and FI criteria?	4				Discussion	Criteria under evaluation as part of M&E program
#20	Smolt quality						

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No	
	Do you produce a high quality smolt?		4			Discussion

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#21	Fish health management practices						
	Are the monthly hatchery monitoring visits being conducted? (PM #26)		4			Review of records/Discussion	
	Are the annual broodstock inspections being conducted? (PM #27)	4				Broodstock held elsewhere	
	Is there pathogen-free water and are the sanitation procedures being followed? (PM #28)		4			Review of records/Discussion	
	Are the following water quality parameters within criteria? (PM #5a-5h)						
	Water temperature				4	Review of records/Discussion	Not a problem
	Dissolved gases		4			Review of records/Discussion	
	Chemistry			4		No data	Run analysis
	Turbidity		4			Review of records/Discussion	
	Alkalinity and hardness		4			Review of records/Discussion	
	Nitrite			4		No data	Run analysis
	Contaminants			4		No data	Run analysis
	Are rearing standards being followed? (PM #19)	4				Review of records/Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Are egg and fish transfer/release requirements met? (PM #31)		4			Review of records/Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#22a	Does hatchery performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas?						
#22a1	<p>Percent smoltification</p> <p>Do you measure percent smoltification?</p> <p>Did you meet the smoltification criteria?</p>		4		4	<p>General visual exam; % descaling, visual parr marks</p> <p>No goal found; being evaluated by M&E program</p>	Develop smoltification criteria
#22a2	<p>Rearing density (prior to release)</p> <p>Did you meet the rearing density criteria just prior to release?</p>	4				Review of records/Discussion	
#22a3	<p>Disease condition (at release)</p> <p>Did you meet all disease regulations just prior to release?</p>		4			Review of records/Discussion	
#22a4	<p>Number (at release)</p> <p>Did you meet the release number goal?</p>				4	Not in compliance for subyearlings, in compliance for yearlings	Develop Umatilla River stock as sole brood source

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#22a5	Size at release						
	Did you meet the size goal?		4			Review of records/Discussion	
#22a6	Dates of release						
	Did you meet the release date goal?		4			Review of records/Discussion	
#22a7	Location of release						
	Did you release the fish at the specified location?		4			Review of records/Discussion	
#22b	Are fish reared in the subbasin or acclimated in the subbasin?						
	Are the fish reared in the subbasin?				4	Rearing occurs at the hatchery; no or limited capability for subbasin rearing. Discussion	None
	Are the fish acclimated in the subbasin?		4				
#22c	Is the release strategy appropriate for the program?		4			Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#23	Transportation facilities						
	Do transportation equipment and personnel receive disinfection before and after use?		4			Discussion	
	Is the fish tank interior disinfected using a solution of 200 ppm active chlorine for 30 minutes minimum or formaldehyde gas generation method (relative humidity of 60% for 2 hrs)?		4			Discussion	
	Is the exterior of the fish transport vehicle disinfected using high pressure steam (115-130°C), high temperature acid, or with 200 ppm chlorine for 30 minutes?				4	Discussion	ODF&W disinfection policies differ from IHOT. Resolve differences
	Is the fish transport vehicle (cab) disinfected using 600 ppm quaternary ammonia compounds (1.5 ml of 50% stock solution/liter water)?				4	Discussion	ODF&W disinfection policies differ from IHOT. Resolve differences
	Is other equipment disinfected including fish pumps, nets, egg sorters, waders, boots, rain gear, hoses and other equipment using one of the following solutions? 200 ppm chlorine for 30 minutes		4			Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	600 ppm quaternary ammonia compound for 30 minutes						
	200 ppm iodophor solution for 10 minutes		4			Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#23 (cont.)	Do personnel wear protective garments when handling fish eggs or cultural water?		4			Discussion	
	Do the fish transport truck/chassis and tank/unit receive an inspection and service prior to the release season?		4			Discussion	
	Is a daily service inspection completed before starting up and leaving for the day?		4			Discussion	
	Does the fish transport unit receive an inspection prior to loading?		4			Discussion	
	Does a pre-loading inspection covering the following: tank water level, pumps or aerators, oxygen injection system settings, displacement gauge, and truck loading/hauling density tables checked and reviewed occur prior to loading the fish in the transport unit?		4			Discussion	
	Do hauling criteria include checking the fish 45 minutes to 1 hour after loading occur?		4			Discussion	
	When fish are active and systems are functioning properly, is the oxygen concentration reduced and maintained at approximately 8 ppm?		4			Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No	
	Is water temperature in the transportation unit maintained within the 42-48 °F range?		4			Discussion
	Do fish releasing procedures include the following criteria?		4			Discussion
	Releasing the fish at the correct release site or into the correct water body.		4			Discussion
	Tempering or the difference between the liberation tank and the target water body should not exceed 10°F.		4			Discussion
	The liberation hose should be angled so that fish gently hit the water. Using a tripod is a method of ensuring the hose will stay at the proper angle.		4			Discussion

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#24	Evaluation practices						
	Has the hatchery conducted fishery contribution studies to:						
	Determine the requirements for evaluating and improving management programs?		4			Discussion/Done as part of M&E program	
	Develop guidelines that define the geographical area and identify component stocks (hatchery and/or wild) that comprise the management unit?		4			Discussion	
	Develop guidelines that define if the proper stocks of fish are currently being used?		4			Discussion	
	Determine which management units contribute to a specific fishery and the time periods of those contributions?		4			Discussion	
	Determine the relative contributions of the various management units to a specific fishery over the different time periods?		4			Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#25	Training practices						
	Does the hatchery have a training schedule for its staff?		4			Review of records/Discussion	
	Does each staff member have a personal training plan approved by a supervisor and reviewed annually?		4			Review of records/Discussion	
	Does the hatchery routinely exchange training details between other hatcheries and agencies?		4			Review of records/Discussion	
	Does the hatchery encourage and reward off-duty training of staff?		4			Review of records/Discussion	
	Does the hatchery conduct monthly staff meetings?		4			Review of records/Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#26	Are monthly hatchery monitoring visits being conducted by a qualified fish health specialist as described below?						
	Conduct visit at least monthly		4			Review of records/Discussion	
	Monitoring conducted by qualified fish health specialist		4			Review of records/Discussion	
	Examine a representative sample of healthy and moribund fish from each lot.		4			Review of records/Discussion	
	Review fish culture practices with hatchery manager.		4			Review of records/Discussion	
	Report finding and results of necropsies on standard form.		4			Review of records/Discussion	
	Recommend appropriate drug or chemical treatment.		4			Review of records/Discussion	
	Summarize fish health status or stock prior to release or transfer to another facility.		4			Review of records/Discussion	
#27	Are all of the functions of the hatchery yearly monitoring visits being completed as described below?						

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Annually examine each broodstock for the presence of reportable viral pathogens.	4				Not at this station	
	Annually screen each salmon broodstock for the presence of <i>Renibacterium salmoninarum</i> .	4				See above	
	Conduct inspection by or under the supervision of qualified fish health specialist.	4				See above	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#28	Is the hatchery following accepted sanitation procedures?						
	Are there any sources of pathogen-free water, especially for incubation and early rearing?		4			Discussion	
	Are the hatchery sanitation procedures understood and being followed as described below?						
	Disinfect/water harden eggs in iodophor?		4			Inspection of facilities/Discussion	
	Are foot baths containing disinfectant placed at the incubation facility's entrance and exit?		4			Inspection of facilities/Discussion	
	Is equipment and rain gear utilized in broodstock handling or spawning sanitized prior to its use elsewhere in the hatchery?		4			Inspection of facilities/Discussion	
	Is equipment used to collect dead fish sanitized prior its use in another pond and/or lot of fish?		4			Inspection of facilities/Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Is equipment, including vehicles used to transfer fish between facilities, disinfected prior to use with any other fish lots or at any other location?		4			Inspection of facilities/Discussion	
	Are rearing vessels sanitized after fish are removed and prior to introducing a new fish lot or stock?		4			Inspection of facilities/Discussion	
	Are dead fish properly disposed of?		4			Inspection of facilities/Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#29	Are water quality parameters being followed?						
	Are the following water quality parameters within criteria? (PM #5a-5h)						
	Water temperature				4	Review of records/Discussion	Not a problem. See PM #5a.
	Dissolved gases		4			Review of records/Discussion	
	Chemistry			4		No data	Run analysis
	Turbidity		4			Review of records/Discussion	
	Alkalinity and hardness		4			Review of records/Discussion	
	Nitrite			4		No data	Run analysis
	Contaminants			4		No data	Run analysis
	Go to PM #21						
#30	Are incubation and rearing standards being followed?						
	Are the incubation practices following the IHOT incubation criteria? (PM #18)			4		Review of records/Discussion	
	Are the rearing practices following the IHOT criteria? (PM #19)	4				Review of records/Discussion	
	Go to rearing practices PM #18-PM #19						
#31	Are egg and fish transfer/release requirements met?		4			Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#32	Is the hatchery's program outlined in a subbasin management plan? Go to subbasin plan PM # 1		4			Columbia Basin System Planning Production Plan and Umatilla Basin Master Plan	
#33	Is the hatchery operating under a current hatchery operational plan? Go to operational plan PM # 2		4			Review IHOT Operations Plan and Umatilla Hatchery and Basin Annual Operations Plan (AOP)	Run analysis
#34	Is a hatchery monitoring and evaluation plan in place? Go to hatchery monitoring and evaluation plan PM # 3		4			M&E program described in AOP	Not a problem

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#35	Does the hatchery program meet requirements established in the regional hatchery policies and subbasin planning documents in the following areas: species, stock, broodstock collection location, broodstock numbers, broodstock collection strategy, and spawning and egg-take protocols?						
	Does the hatchery program meet the requirements for the following?						
	Species protocols (PM #4a)		4			Review of records/Discussion	
	Stock protocols (PM #4a)		4			Review of records/Discussion	
	Broodstock collection location protocols (PM #41)	4				No broodstock collection at hatchery	
	Broodstock numbers protocols (PM #42)	4				No broodstock at hatchery	
	Broodstock collection strategy protocols (PM #41)	4				No broodstock at hatchery	
	Spawning protocols (PM #42)	4				No spawning at hatchery	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Egg-take protocols (PM #42)	4				No egg-take at hatchery	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#36	Does the hatchery's performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas: percent smoltification, rearing density, disease condition, and the number, size date(s), and location of release?						
	Percent smoltification (PM #22a1)			4		Measure smoltification; but no goal found	
	Rearing density (PM #22a2)		4			Review of records/Discussion	
	Disease condition (PM #22a3)		4			Review of records/Discussion	
	Number at release (PM #22a4)				4	Review of records/Discussion	Develop Umatilla stock as sole brood source
	Size at release (PM #22a5)		4			Review of records/Discussion	
	Date of release (PM #22a6)		4			Review of records/Discussion	
	Location of release (PM #22a7)		4			Review of records/Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#37	Are fish reared in the subbasin or acclimated in the subbasin? See PM #22b		4			Fish are not reared in the subbasin; they are acclimated in the subbasin	
#38	Is the release strategy appropriate for the program? See PM #22c		4			Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#39	For new programs, has a broodstock collection plan been developed?						
	Is the broodstock collection plan written?	4				Not a new program	
	For a non-captive broodstock program:	4				See above	
	Was an unbiased, representative sample collected?						
	Was the recommended number of broodstock collected?						
	For a captive broodstock program:	4					
	Were captive brood progeny excluded as donors for propagating the next generation of the captive broodstock program?					See above	
	Were full-sib crosses avoided?						
	Is the broodstock collection plan understood and being followed by staff?	4				See above	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#40	For a new program, was the donor selection outline followed in selecting the hatchery broodstock?						
	Is a donor selection plan written?	4				Not a new program	
	Was the donor selection outline followed in selecting the broodstock?	4				See above	
	Was the target stock recommended in the donor selection process actually used?	4				See above	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#41	For existing programs, were the broodstock collection procedures followed?						
	Is the broodstock collection plan written?	4					
	Does the broodstock collection plan follow the guideline:						
	Was an unbiased, representative sample collected?	4					
	Was the recommended number of broodstock collected?	4				Discussion	
	Were the broodstock collection procedures in hatchery operation plan understood and followed?	4				Discussion	
	Were the broodstock collection procedures in hatchery operation plan understood and followed?	4				Discussion	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#42	Was the appropriate number of spawners, male/female ratios, and fertilization protocols used?						
	Are the spawning protocols written?				4	No written protocols	Develop written protocols
	Are daily or weekly spawning logs available?	4				At other stations for the period audited	
	Was the appropriate number of spawners used?	4				See above	
	Did you attempt to spawn all collected broodstock and randomize mating with respect to age class, and other traits?	4				See above	
	Was the sex-ratio within the limits given in the performance standards?	4				See above	
	Were the fertilization protocols followed?	4				See above	
	If the hatchery needed to reduce the number of eggs retained, was this done by representative sampling of each male/female cross?	4				See above	

Table 2 Umatilla Hatchery - URB Fall Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#43	Is there a genetics monitoring and evaluation program in place?						
	Is a genetics monitoring and evaluation program available?				4	Discussion	Develop a genetics M&E program
	Does the plan address the following elements listed in IHOT:						
	Does the program have elements needed to meet evaluation goals 1-4?			4		No program is in place	Develop a genetics M&E program
	Has a qualified geneticist reviewed and endorsed the program (goal 5)?			4		No program is in place	Develop a genetics M&E program
	Will the program collect the data and maintain the records needed to evaluate compliance on an ongoing basis (goal 5)?			4		No program is in place	Develop a genetics M&E program
	Is the program understood and followed by staff?			4		No program is in place	Develop a genetics M&E program

Remedial Actions

Based on the compliance status for each performance measure, remedial actions were developed. The required remedial actions are organized into five categories. The types of categories range across a spectrum from those actions that are beyond human control, to those that require a change in agency policy or procedures, to those that involve a significant capital cost to put in place. The following are the five types of remedial actions identified under phase 1 of the audit:

The Five Types of Remedial Actions

Type	Description
1	Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery
2	Remedial actions requiring changes in agency policies or procedures
3	Remedial actions requiring changes in monitoring coverage or interval
4	Remedial actions requiring significant capital expenditures
5	Remedial actions that may require significant capital expenditures but are not clearly definable at this time

Remedial Actions at Umatilla Hatchery - URB Fall Chinook

This section presents the corrective actions required to bring the Umatilla Hatchery - URB Fall Chinook program into compliance with the IHOT performance measures. The remedial actions suggested here are just that, suggestions developed by the Montgomery Watson Audit Team. For some non-compliance areas, other remedial actions could be proposed. The required remedial actions are cross-referenced to each IHOT performance measure that was not in compliance. Where appropriate, the costs associated with the remedial actions are also presented (Table 3).

The cost estimates presented in this section are based on professional experience from similar projects. In most cases, only a lump-sum figure is presented and detailed take-off lists have not been prepared. The cost estimates are essentially order of magnitude estimates ($\pm 40\%$).

More importantly, the suggested remedial activities may also present several levels of action. Optional actions have been listed for several problems. These optional actions are desirable for either operational or safety considerations.

Table 3. Remedial Actions Required at Umatilla Hatchery - URB Fall Chinook

Remedial Action Required	Cost	PMS ¹
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery		
Improve green-egg to eyed-egg survival; smolt to fry survival, and number at release over time by continued increase in the use of Umatilla River broodstock as the run size increases	----	4d, 4f, 22a4
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Document adult contribution	----	4a
Document adult pre-spawning survival over time	----	4b
Modify temperature of hatchery water supply (not a problem because the hatchery meets program requirements)	----	5a, 21, 29
Begin routine testing of alarms using IHOT recommendations	----	6
No telephone pagers in use (not a problem because onsite residences are hard wired to alarms)	----	6
Interior of insulated feed hoppers exceeds 80 °F on very hot days	----	12

Remedial Action Required	Cost	PMS ¹
Develop specific incubation standards and written incubation practices for the IHOT Operations Plan	---	18
Develop written flow and loading criteria for incubation in IHOT Operations Plan	---	18
Develop smoltification goal and monitoring plan	---	22a1, 36
Follow IHOT disinfection policies for transportation	---	23
Develop written spawning protocols in IHOT Operations Plan	---	42
Develop a genetics monitoring and evaluation program in IHOT Operations Plan	---	43

Remedial Action Required	Cost	PMS ²
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Run analysis for chemistry parameters	----	5c, 21, 29
Run analysis for nitrite	----	5f, 21, 29
Run analysis for contaminants	----	5g, 21, 29
Conduct IHOT feed QA/QC testing	----	12
Type 4 - Remedial actions requiring significant capital expenditures		
Provide a second set of screens for all raceways (24 Michigan ponds and 12 Oregon ponds)	\$18,000	10
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
None identified	----	

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Umatilla Hatchery - URB Fall Chinook program contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries. Data is reported by broodyear. A broodyear refers to the adult contribution from the eggs produced from a single group of spawning adults. For some species, this may include fish caught as 2-, 3-, 4-, 5-, and 6-year old fish. Because of the return distribution and data processing delays, the complete adult contribution for a given broodyear may not be available until 4 to 5 years after the fish have been released from the hatchery.

**Table 4. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Umatilla Hatchery - URB Fall Chinook**

Year	Fisheries	Spawning Grounds¹	Hatchery¹	Total Combined Contribution	Smolt to Adult Survival (percent)
	(Broodyear)	(Broodyear)	(Broodyear)	(Broodyear)	
1981					
1982					

¹1 Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

¹1 Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990					
1991	Complete data not available	Complete data not available	Complete data not available	Complete data not available	Complete data not available
1992	No data yet available	No data yet available	No data yet available	No data yet available	No data yet available

Annual Operating Expenditures

The level and detail of annual operating expenditures varies widely depending on hatchery, operating agency, and funding source. When provided, expenditures were presented in terms of personnel costs, operating costs (power, feed, supplies), capital costs, indirect costs charged to the federal government, third-party costs, and other costs. These cost components were summed to determine a total hatchery annual cost. Based on discussion with the hatchery manager, the percent of total hatchery costs allocated to a given program was estimated. The total hatchery costs and the percent of hatchery costs allocated to a given program were used to compute the cost of a given program. Table 5 shows the annual operating expenses for the overall Umatilla Hatchery URB Fall Chinook program. For programs that occur at more than one facility (as shown on Table 1 in Section 3), the cost breakdown for the component(s) at each facility is presented in separate tables (Tables 5a and 5b).

Table 5. Annual Operating Expenses - Umatilla Hatchery - URB Fall Chinook

Facility	1994	1995	1996
1. Umatilla Hatchery	\$234,010	\$333,986	\$421,281
2. Umatilla Satellites (Three Mile Dam, Imeques C mem-ini-kem, and Thornhollow)	\$0	\$80,583	\$160,932
3.			
4.			
5.			

Total Program Costs	\$234,010	\$414,569	\$582,213
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The total expenditures for the Umatilla Hatchery are presented in Table 6 by program. The detailed breakdown of program expenditures at this hatchery is presented in separate tables (Tables 6a, 6b, 6c, and 6d).

Table 6. Annual Operating Expenses for All Programs - Umatilla Hatchery

Program	1994	1995	1996
1. Summer Steelhead	\$150,898	\$208,110	\$191,650
2. Spring Chinook	\$516,517	\$300,453	\$260,190
3. Fall Chinook	\$234,010	\$333,986	\$421,281
4. Winter Steelhead	\$0	\$0	\$0
5.			
Total Hatchery Costs	\$901,425	\$842,549	\$873,121

Table 5a. Annual Operating Expenses: Umatilla Hatchery URB Fall Chinook

Expenditure Occurring at Umatilla Hatchery

Component	1994	1995	1996
Personnel Costs	\$342,901	\$344,365	\$333,483
Operational Costs	\$427,692	\$371,874	\$421,818
Capital Costs	\$300	\$0	\$0
Indirect Costs	\$130,532	\$126,310	\$117,820
Lumped Hatchery Costs			
Lumped Third-Party Costs	\$0	\$0	\$0
Total Hatchery Costs	\$901,425	\$824,549	\$873,121
Source of Funds			
100% BPA			
Program Production (lb)	43,809	45,2062	63,719
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	25.96	39.64	48.25
Program Costs	\$234,010	\$333,986	\$421,281

¹ When it was not possible to obtain a detailed cost breakdown from an agency or Third-Party, the undivided costs were entered here.

Table 5b. Annual Operating Expenses: Umatilla Hatchery URB Fall Chinook

Expenditure Occurring at Umatilla Satellites

Component	1994	1995	1996
Personnel Costs			
Operational Costs			
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs	\$169,421	\$198,917	\$246,656
Lumped Third-Party Costs			
Total Hatchery Costs	\$169,421	\$198,917	\$246,656
Source of Funds			
BPA	100%	100%	100%
Program Production (lb)	0	67,252	133,169
Total Production (lb)	101,319	166,009	204,104
Program as Percent of Total	0%	40.51%	65.25%
Program Costs	\$0	\$80,583	\$160,932

¹ When it was not possible to obtain a detailed cost breakdown from an agency or Third-Party, the undivided costs were entered here.

Table 6a. Detailed Expenditures at Umatilla Hatchery by Program

Summer Steelhead

Component	1994	1995	1996
Personnel Costs	\$342,901	\$344,365	\$333,483
Operational Costs	\$427,692	\$371,874	\$421,818
Capital Costs	\$300	\$0	\$0
Indirect Costs	\$130,532	\$126,310	\$117,820
Lumped Hatchery Costs			
Lumped Third-Party Costs	\$0	\$0	\$0
Total Hatchery Costs	\$901,425	\$824,549	\$873,121
Source of Funds			
100% BPA			
Program Production (lb)	28,253	28,166	28,990
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	16.74	24.7	21.95
Program Costs	\$150,898	\$208,110	\$191,650

¹ When it was not possible to obtain a detailed cost breakdown from an agency or Third-Party, the undivided costs were entered here.

Table 6b. Detailed Expenditures at Umatilla Hatchery by Program

Spring Chinook

Component	1994	1995	1996
Personnel Costs	\$342,901	\$344,365	\$333,483
Operational Costs	\$427,692	\$371,874	\$421,818
Capital Costs	\$300	\$0	\$0
Indirect Costs	\$130,532	\$126,310	\$117,820
Lumped Hatchery Costs			
Lumped Third-Party Costs	\$0	\$0	\$0
Total Hatchery Costs	\$901,425	\$824,549	\$873,121
Source of Funds			
100% BPA			
Program Production (lb)	96,700	40,676	39,358
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	57.3	35.66	29.8
Program Costs	\$516,517	\$300,453	\$260,190

¹ When it was not possible to obtain a detailed cost breakdown from an agency or Third-Party, the undivided costs were entered here.

Table 6c. Detailed Expenditures at Umatilla Hatchery by Program

Fall Chinook

Component	1994	1995	1996
Personnel Costs	\$342,901	\$344,365	\$333,483
Operational Costs	\$427,692	\$371,874	\$421,818
Capital Costs	\$300	\$0	\$0
Indirect Costs	\$130,532	\$126,310	\$117,820
Lumped Hatchery Costs			
Lumped Third-Party Costs	\$0	\$0	\$0
Total Hatchery Costs	\$901,425	\$824,549	\$873,121
Source of Funds			
100% BPA			
Program Production (lb)	43,809	45,206	63,719
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	25.96	39.64	48.25
Program Costs	\$234,010	\$333,986	\$421,281

¹ When it was not possible to obtain a detailed cost breakdown from an agency or Third-Party, the undivided costs were entered here.

Table 6d. Detailed Expenditures at Umatilla Hatchery by Program

Winter Steelhead

Component	1994	1995	1996
Personnel Costs	\$342,901	\$344,365	\$333,483
Operational Costs	\$427,692	\$371,874	\$421,818
Capital Costs	\$300	\$0	\$0
Indirect Costs	\$130,532	\$126,310	\$117,820
Lumped Hatchery Costs			
Lumped Third-Party Costs	\$0	\$0	\$0
Total Hatchery Costs	\$901,425	\$824,549	\$873,121
Source of Funds			
100% BPA			
Program Production (lb)	203	390	304
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	< 0.2%	< 0.4%	< 0.3%
Program Costs	\$0	\$0	\$0

¹¹ PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT

¹¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

performance measures are listed in Table 2 in Section 3 in numerical order.

¹1 PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 in Section 3 in numerical order.